

Two new Poduromorpha from Navarra (Spain)

(Insecta, Collembola)

By R. Jordana

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Mesaphorura leitzaensis, spec. nov. of Tullberginae and *Xenylla caudata*, spec. nov. of Hypogastruridae are described from two localities in Navarra (Spain). *Mesaphorura leitzaensis*, spec. nov. is related to *M. macrochaeta* Rusek, 1976 and *M. betschi* Rusek, 1979, and it is found in soil of a oak forest in Leitza (Navarra). *Xenylla caudata*, spec. nov. is related to *X. boernerii* Axelson, 1901 and *X. acauda* Gisin, 1947, it is found in the litter of an evergreen-oak (*Quercus rotundifolia*) mediterranean forest in Biurrun (Navarra).

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Introduction

In the preliminary sampling for the research project (FOR90-0928-C02-02) granted by the National Institute of Agricultural Research (I.N.I.A.) on "Study of the forestry impact of fire and its repair: Edaphology, flora, fauna and erosion", among the studied species two new species have been found.

Sampling has been performed by soil cores of 6 cm depth. The extraction method of heptane flotation (Walter et al. 1987) has been used. The two new species are described and justified below.

Mesaphorura leitzaensis, spec. nov.

Fig. 1

Types. Holotype: ♀ labelled FUZPRS11A1-12, 9-IV-1991, Jordana leg. (Zoology Museum, Navarra University, Spain). Paratypes: 4 ♀♀ in Zoologische Staatssammlung München, Germany; 4 ♀♀ in National Museum Natural Sciences, Spain. All of them from Oak forest soil, 900 m, Leitza, Navarra, Spain.

Diagnosis. Lateral sensillas on thorax II and III, and seta p_5 on abdominal segment V thickened. Sensilla p_3 on abdominal tergites III and V spindle-shaped. Setae m_4 and m_5 present on abdominal tergite IV. Formula of pseudocelli: 11/011/10011. Thoracic pseudocelli between p_3 and p_4 setae. Antennal segment IV with thickened sensillae a-e. Sensory organ of the third antennal segment typical of genus. Postantennal organ narrow, with 25-30 simple vesicles in two parallel rows. Anal spines shorter than the claw. Only females known.

Description

Body elongated, mean body length 463 μm , white colour. Granulation of whole body fine and uniform, coarser in the central part of the abdominal tergite III. Setae differentiated into micro- and macrochaetae (Figs 1 a, b).

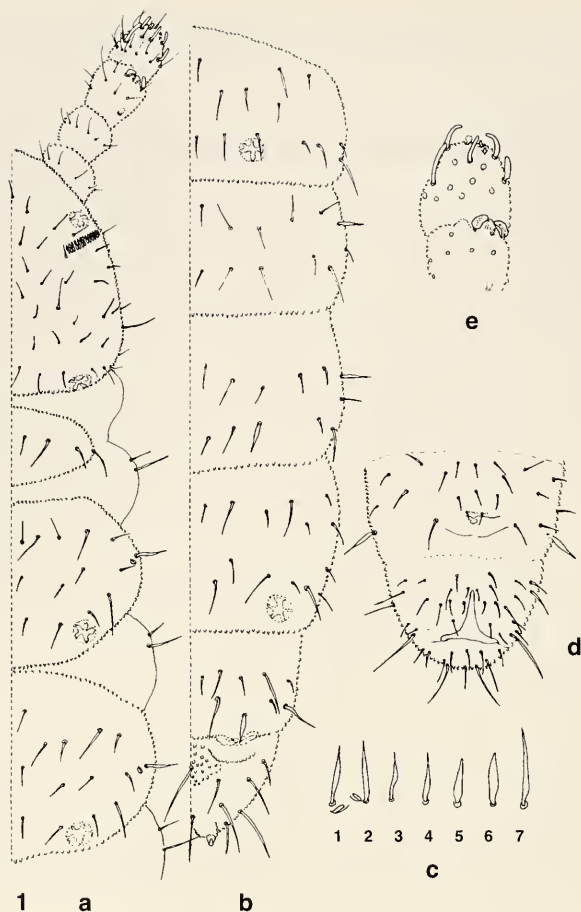


Fig. 1. *Mesaphorura leitzaensis*, spec. nov. a & b. Dorsal chaetotaxy. c. Thickened sensillae; 1. Seta s on mesonotum; 2. Seta s on metanotum; 3. Lateral sensilla la on abdominal tergite II; 4. Lateral sensilla la abdominal tergite III; 5. p_3 on abdominal tergite III; 6. p_3 on abdominal tergite V; 7. p_3 on abdominal tergite V. d. Ventral chaetotaxy on last two abdominal sternites. e. Third and fourth antennal segments.

Dorsal chaetotaxy as following:

Row	Thorax		Abdomen				
	1	II-III	I	II	III	IV	V
a	-	10	10	10	10	10	10
m	8	8 (1)	2 (3)	-	-	4 (6)	-
p	-	8 (2)	10	10	10 (5)	10	8 (5) (7)
Subc./l.	2	3	2p	2a (4)	2a (4)	2p	

a: anterior; m: medial; p: posterior; Subc.: subcoxal (thoracic); l: lateral (Abdominal); (1): m_2 absent and s thickened; (2): p_2 absent; (3): m_4 present; (4): la thickened; (5): p_3 spindle-shaped; (6): m_4 (microchaeta), m_5 (macrochaeta) presents; (7): p_5 thickened.

Pronotum with 4+4 setae. Lateral sensilla s (Fig. 1: c1, c2) on meso- and metanotum thickened and shorter than macrochaeta p_5 . Sensory microsensilla s' on meso- and metanotum present in a small pit (Fig. 1a). Meso- and metanotum with a_2 .

Abdominal tergites I-III with a_2 , lateral sensilla la on abdominal segments II and III (Fig. 1: c3, c4) thickened but shorter than those of meso- and metanotum. Sensilla p_3 on abdominal tergites III and V spindle-shaped and spiniform (Fig. 1: c5, c6). In the abdominal tergite IV seta p_1 is macrochaeta and p_2 microchaeta, setae m_4 and m_5 present. Abdominal tergite VI with two anal spines on papillae, two crescentic ridges present on anterior margin of this tergite. Chaetotaxy of anal lobes complete, with l_2 , and l_3 , (Fig. 1d).

Antennae shorter than head (Fig. 1a). Antennal segment IV with five thickened sensillae a-e, two sensory microsensillae and an apical globular papilla (Fig. 1e). Sensory organ of antennal segment III with two small sensory rods concealed behind an integumental fold and two thick sensory clubs bent towards each other; a smaller and thinner sensory club present on the ventral side of this antennal segment (Fig. 1e).

Postantennal organ with 25-30 single vesicles in two parallel rows.

Legs short. Tibiotarsi with 11 normal setae. Claw without inner teeth. Empodial appendage reduced, without basal lamella.

Pseudocelli circular, with star like centre. Formula of pseudocelli: 11/011/10011; those on meso- and metanotum are located between p_3 and p_4 setae (Fig. 1a).

Ventral Tube with 4+4 setae and two more setae on each side. Without furca or its trace. Genital plate as shown in Fig. 1d. Only females known.

Affinities. *Mesaphorura leitzaensis* spec. nov. is related to *M. macrochaeta* Rusek, 1976. Both species have in common the same number and location of pseudocelli; a_2 seta is present on metanotum and abdominal tergites I-V; l_2 , is present on anal lobes; m_4 and m_5 setae are present on abdominal tergite IV and p_1 is macrochaeta and p_2 is microchaeta. Therefore the new species differs from *M. macrochaeta* by the presence of thickened lateral thoracic and abdominal sensillae in the new species. The setae between macrochaetae a_4 on abdominal tergite V are different in each species: In *M. macrochaeta* these setae are of the same length or a_1 is mesochaeta, a_2 microchaeta and a_3 mesochaeta; in the new species, however a_1 is microchaeta, a_2 mesochaeta and a_3 microchaeta (Fig. 1b). The new species is very near to *M. betschi* Rusek, 1979. Both have the same sensillar chaetotaxy, but are easily separated by the presence of seta a_2 on metanotum and abdominal tergite I in the new species, and their absence in *M. betschi*.

Derivatio nominis. The name of this new species is derived from the locality.

Xenylla caudata, spec. nov

Figs. 2, 3

Type material: Holotype: ♂, labelled with BPRM12A0-51; Allotype ♀, labelled with BPRM12A0-46; Paratypes: 12 ♂♂, 19 ♀♀ and 10 specimens in alcohol. Deposited in Zoology Museum, Navarra University, Spain, 3 paratypes in National Museum Natural Sciences, Spain; 4 paratypes in Zoologische Staatssammlung München. All of them from litter of the mediterranean evergreen oak forest (*Quercus rotundifolia*), 600m, Biurrun (Campanas), Navarra, Spain.

Diagnosis. Antennal segment IV with 6 thickened sensillae (Fig. 3b). Head without c_2 seta, p_2 forward displaced and $L_1 < L_3$. Metanotum with a_2 backward displaced and p_2 forward displaced. Thoracic sternites II and III with 1+1 setae. Abdominal sternite II without a_5 , only a_6 present. Abdominal sternite IV with b_3 seta present. With furca but without mucro, with a seta on the dens.

Description

Body colour dark blue, length: Species mean 642 μm (n=33), ♂♂ 602 μm (450-825), ♀♀ 664 μm (450-850).

Antennal segment IV with 6 thickened sensillae (Fig. 3b), Three dorsoexternal, one dorsal and two dorsointernal; two subapical microsensillae and a terminal vesicle. Sensory organ of antennal segment III typically of genus.

The general chaetotaxy denomination follows the papers of Gama (1987, 1988) with the exception of the posterior setae row of the head (p and c of Gama, c and p in this paper) and the lateral setae of the meso- and metanotum (la_3 , la_2 , la_1 and lp of Gama are in this paper a_4 , a_5 , a_6 and p_6). These two denomination changes are to fit the chaetotaxy into the general one of the Collembola Hypogastruridae.

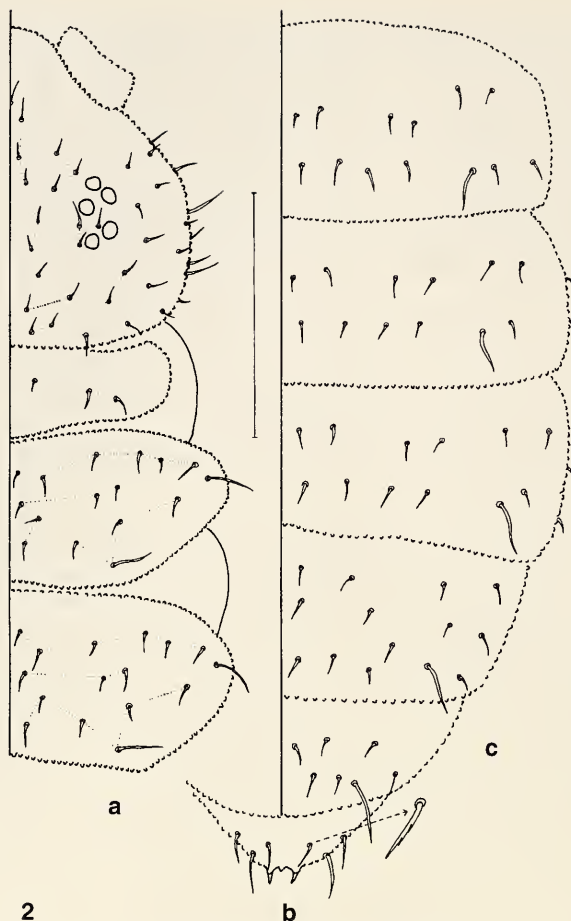


Fig. 2. *Xenylla caudata*, spec. nov. a & b. Dorsal chaetotaxy (Scale = 100 μ m).

Head and its chaetotaxy (Fig. 2a): Five eyes on each side. The chaetotaxy as in genus with the following exceptions: c_2 absent (Character c of Gama 1988), p_2 forward displaced, $L_1 < L_3$ (Character g). Ventrally all setae present.

Thoracic and abdominal chaetotaxy (Figs 2 a, b). Dorsal: Pronotum with 3+3 setae. p_2 on mesonotum forward displaced; a slightly backward displacement of a_2 . On the metanotum both setae (a_2 and p_2) displaced (Characters h_1 and h_2). Some specimens, always asymmetrically lack m_3 or m_4 setae.

Abdominal tergites I-III without p_5 and with p_6 sensorial (s). Abdominal tergite IV without a_3 .

Ventral: Thoracic sternites I and II without setae (Character t). Ventral tube with 4+4 setae. Abdominal sternite II without a_5 ; a_6 present. There is a pair of setae on the abdominal sternite III in front of tenaculum, that has two teeth. On the abdominal sternite IV, additionally to complete chaetotaxy there is a seta b_3 like in *X. boernerii* Axelson, 1905 (Fig. 3a).

Furcal appendix without mucro, dens of 4 Mm length with a seta (Fig. 3c).

Legs with 19, 19 and 18 setae in the I, II and III tibiotarsa respectively; each tibiotarsus has two tenent hairs with slightly broadened tip. They are located dorsally in the distal hairs verticille. Claw without teeth.

Affinities. Following the systematic work of Gama 1988 on this genus worldwide, *Xenylla caudata*, spec. nov. has the same chaetotaxy that *X. acauda* Gisin, 1947 (non adaptive characters: c, g, h_1 , h_2 , and

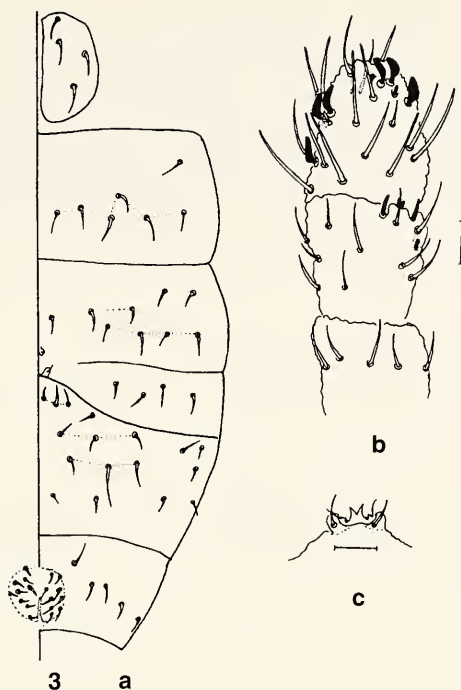


Fig. 3. *Xenylla caudata*, spec. nov. a. Ventral chaetotaxy on abdominal segments I-V. b. Dorsal view of antennal segments II-IV (Scale = 10 μ m). c. Furca (Scale - 10 μ m).

t) and 6 sensillae on the fourth antennal segment. The new species is separated by the presence of the furcal appendix and b_3 seta on abdominal sternite IV.

The antennal chaetotaxy and absence of setae on the thoracic sternites II and III makes *X. caudata* similar to *X. brevicauda* Tullberg, 1869; but the latter is quite different in the tibiotarsal chaetotaxy (ventral setae with broadened tip, Stach 1949), and in having $L_1 > L_3$ on the head.

X. caudata is similar to *X. boernerii* Axelson, 1905 and *X. tullbergi* Börner, 1903 in the non-adaptive characters **c**, **g**, **h₁** and **h₂** and presence of a short furcal appendage, but is easily separable from them by the character **t** of Gama (setae absence on thoracic sternites) and by the possession of 6 sensillae on the fourth antennal segment (3+1 in *X. boernerii* and *X. tullbergi*). From *X. tullbergi* it is further separable by absence of mucro and presence of b_3 on abdominal sternite IV.

Comparative table of differential characters

	Gama characters					Mucro	Dentes setae number	Tibiotarsi broadened tip ventral setae	Antennal sensillae
	c	g	h ₁	h ₂	t				
<i>X. brevicauda</i>	+	-	+	+	+	Fused	1-2	present	6
<i>X. tullbergi</i>	+	+	+	+	-	Fused	1	absent	4
<i>X. boernerii</i>	+	+	+	+	-	absent	1	absent	4
<i>X. acauda</i>	+	+	+	+	+	absent	without furca	absent	6
<i>X. caudata</i> , spec. nov.	+	+	+	+	+	absent	1	absent	6

Derivatio nominis. The name make reference as opposite to "acauda".

Resumen

Se describen dos nuevas especies de Podoromorpha (Collembola) de Navarra, España: *Mesaphorura leitzaensis*, spec. nov. nueva especie de Tullberginae y *Xenylla caudata*, spec. nov. nueva especie de Hypogastruridae.

M. leitzaensis, spec. nov. esta relacionada con *M. macrochaeta* Rusek, 1976 y *M. betschii* Rusek, 1979, y ha sido encontrada en muestras de suelo de un robledal en la localidad de Leitza (Norte de Navarra). *X. caudata*, spec. nov. tiene caracteres intermedios entre *X. boernerii* Axelson, 1905 y *X. acauda* Gisin, 1947, y ha sido encontrada en el horizonte superficial de una carrascal mediterráneo en la localidad de Biurrun (Navarra Media).

References

- Gama, M.M. 1987. Clef pour le détermination des espèces et sous-espèces de *Xenylla* a l'échelle mondiale (Insecta, Collembola). - Cienc. Biol. Ecol. Syst. (Portugal) 7(1-2): 45-55
- 1988. Filogenia das espécies de *Xenylla* à escala mundial (Insecta, Collembola). - Evolución Biológica, 2: 139-147
- Rusek, J. 1976. New Onychiuridae (Collembola) from Vancouver Island. - Can. J. Zool., 54: 19-41
- 1979. Three new *Mesaphorura*-species (Collembola: Tullberginae) from Europe. - Vest. Ceskoslov. Spolecnosti Zool., 43(4): 290-299
- Stach, J. 1949. The Apterygotan fauna of Poland in relation to the world-fauna of this group of Insects. Neogastruridae and Brachystomellidae. - Acta monogr. Mus. Hist. natur. Krakow 2: 1-341
- Walter, D.E. Kethley, J. & C. Moore 1987. A heptane flotation method for recovering Microarthropods from semiarid soils, with comparison to the Merchant-Crossley high gradient extraction method and estimates of Microarthropods biomass. - Pedobiologica, 30: 221-232.